Nasal cavity
Nose

Divided into two regions:
• The external nose
• The internal nasal cavity
The external nose
• 2 openings called **nostrils** separated by **nasal septum**
• The lateral margin **ala of nose** rounded and mobile.
The framework of the external nose is made of:

- nasal bones
- the maxillae bone
- frontal bone

Below the bone parts its formed of **plates of hyaline cartilage**
Blood supply

- branches of **ophthalmic a.**
- and the **maxillary a.**
- skin of the ala and lower part of the septum are by branches of **facial artery.**
Nerve supply

- The infratrochlear and external nasal branches of the ophtalmic nerve (CN V).
- Infraorbital branch of the maxillary nerve (CN V).
The nasal cavities
• Separated by a midline **nasal septum**
• Each nasal cavity has a **floor, roof, medial wall, and lateral wall**
• Lateral to the nasal cavities are the **orbits**
• from oral cavity below by the **hard palate**
• from the cranial cavity above by parts of the **frontal, ethmoid, and sphenoid bones.**
• The anterior apertures of the nasal cavities are **nares**, which open onto the inferior surface of the nose.
• The posterior apertures are the **choanae**, which open into the nasopharynx.
• Sinuses
• NLD
Regions

- Each nasal cavity consists of three general regions:
  - The **nasal vestibule** is a small dilated space just internal to the naris that is lined by skin and contains hair follicles;
  - The **respiratory region** is the largest part of the nasal cavity, has a rich neurovascular supply, and is lined by respiratory epithelium composed mainly of ciliated and mucous cells;
  - The **olfactory region** is small, is at the apex of each nasal cavity, is lined by olfactory epithelium, and contains the olfactory receptors.

- In addition to housing receptors for the sense of smell (olfaction), the nasal cavities adjust the temperature and humidity of respired air, and trap and remove particulate matter from the airway.
Ethmoid bone

- *Ethmoid bone*
- The single ethmoid bone is one of the most complex bones in the skull.
- It contributes to the roof, lateral wall, and medial wall of both nasal cavities, and contains the ethmoidal cells (ethmoidal sinuses).
Walls, floor, and roof

- **Medial wall**
- **nasal septum**, which is oriented vertically in median sagittal plane and separates right and left nasal cavities

**Septum of:**
1. septal cartilage
2. vertical plate of the ethmoid
3. vomer.
Nasal septum:

* Above: perpendicular plate of the ethmoid.
  * Below and in front: septal cartilage.
  * Below and behind: vomer.
Floor

It consists of:

- palatine process of **maxilla** & horizontal plate of the **palatine bone**, which together form the **hard palate**.

- The **naris** opens anteriorly into the floor.
Roof

• narrow

**Formed by:**

1. cribriform plate of the ethmoid bone
2. nasal and frontal bones, and posteriorly sphenoid Bone.
It has 3 curved long projections called nasal conchae:
1) Superior concha.
2) Middle concha.
3) Inferior concha.

The space below each of these conchae is called nasal meatus.
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<td>Nasolacrimal duct (red)</td>
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Features of the middle meatus:

- presents a rounded eminence called **bulla ethmoidalis** which is bounded in front and below by a curved groove called **hiatus semilunaris**.
Openings of the middle meatus:

several paranasal sinuses have their openings in this meatus as follows:

a) Maxillary air sinus: opens into the hiatus semilunaris below the bulla ethmoidalis.

b) Anterior ethmoidal sinus: opens into the hiatus semilunaris in front of the bulla ethmoidalis.

c) Middle ethmoidal sinus: opens on the bulla ethmoidalis.

d) Frontal sinus: opens into the upper part of the hiatus semilunaris.
Other openings in the lateral wall of the nose:

a) Sphenoidal sinus: opens into the spheno-ethmoidal recess just above the superior concha.

b) Posterior ethmoidal sinus: opens into the superior meatus (below the superior concha).

c) Naso-lacrimal duct: opens into the inferior meatus.
Nerves of nasal cavity:

1- Sensory: ophthalmic division (V1) and maxillary division (V2) of the trigeminal nerve

2- Olfactory nerve: It is the nerve of smell. It supplies the olfactory mucosa which is situated in the roof of the nasal cavity.
Arteries of nasal cavity:

1. Branches of maxillary artery main supply of the nose (Sphenopalatine artery).

2. Septal branch: from facial artery.

3- Ethmoidal branches: from Ophthalmic artery.

Bleeding from the nose (epistaxis).
PARANASAL AIR SINUSES
• They are cavities found in the interior of the maxilla, frontal, sphenoid, & ethmoid bones.

• communicate with the nasal cavity.
**Functional importance:**

They have the following functions:

* They make the skull lighter (filled with air).
* They act as resonating chambers for the voice.
* They increase the surface area of the nasal mucous membrane and thus help warming the air before entering the lung.
1) Sphenoidal air sinuses:
*These are 2 sinuses which lie **inside the body of sphenoid** and are separated from each other by a bony septum.

2) Ethmoidal air sinuses:
*These are large number of intercommunicating cavities present **inside the ethmoid** bone and open into the nose. Lies between nose and orbit.

3) Frontal air sinuses:
*These are 2 sinuses which **lie in the frontal bone** just above the root of the nose.
*They are separated from each other by a septum.
Lateral Sinus Anatomy

- Aerated at birth
  - Maxillary sinuses

- Age 6-7
  - Frontal / sphenoidal sinuses

- Puberty - approx 17-18 yrs
  - Ethmoid
N.B.: All paranasal sinuses open into the middle meatus of the nose except 2:

1) the sphenoidal sinus (into the spheno-ethmoidal recess).

2) the posterior ethmoidal sinus (into the superior meatus).
MAXILLARY AIR SINUS

It is a pyramidal cavity situated inside the body of the maxilla. It is the largest paranasal air sinus.

*WALLS:
- **Roof:** separates the sinus from the orbit and lodges the infra-orbital nerve and vessels.

- **Floor:** is formed by the alveolar process of the maxilla.
  The roots of the 1st and 2nd molar teeth project into the floor.
Relations:

* **Medially:** nasal cavity. The sinus opens into the middle meatus of the nose.
* **Above:** orbit
* **Below:** roots of the molar and premolar teeth.
Frontal Sinuses

• Second largest sinuses
  • 2 – 2.5 cm

• Normally:
  • Between tables of vertical plate in frontal bone
  • Can extend beyond frontal bone into the orbital plates

• Rarely symmetrical

• Number varies (occasionally absent)

• Drain into middle nasal meatus
Sphenoid Sinuses

- Below sella turcica
  - Extends between dorsum sellae and post clinoid processes

- Can be single or paired
  - Usually no more than two

- Drains into sphenoethmoidal recess of nasal cavity
Ethmoid Sinuses

- Within lateral masses of ethmoid bone
- Three groups:
  - Anterior, middle & posterior
- Anterior & middle
  - 2-8 cells
  - Drains into middle nasal meatus
- Posterior
  - 2-6 cells
  - Drain into superior nasal meatus
Osteomeatal complex – coronal view

- Pathways of communication
  - Frontal, ethmoid and maxillary

- 2 key passageways
  - Infundibulum
  - Middle nasal meatus
Osteomeatal Complex